

6. WHAT IS CLAIMED IS:

1. A flat panel display device comprising:

a rear substrate including an insulating substrate and a plurality of cold cathode elements disposed on said insulating
5 substrate for emitting electrons;

a display substrate including a light-transmissive substrate disposed to face said rear substrate and phosphors disposed on said light-transmissive substrate for generating light when excited by electron beams from said plurality of cold cathode elements;

10 a peripheral frame member interposed between said rear substrate and said display substrate such that a space enclosed by said peripheral frame member, said rear substrate and said display substrate is vacuum tight; and

15 a metal sheet perforated with a plurality of holes arranged in a matrix configuration with said plurality of holes having said phosphors disposed within to form a display region.

2. A flat panel display device according to claim 1, wherein said display substrate further includes an adherent layer for affixing said metal sheet to said light-transmissive substrate.

20 3. A flat panel display device according to claim 1, wherein said metal sheet is perforated with said plurality of holes after said metal sheet is affixed to said light-transmissive substrate with an adherent layer.

25 4. A flat panel display device according to claim 2, wherein said adherent layer is made chiefly of one of glass, ceramics and

alumina.

5. A flat panel display device according to claim 4, wherein said adherent layer is a layer having its light transmission limited to a specified value, and made chiefly of one of a glass, ceramics
5 and alumina.

6. A flat panel display device according to claim 2, wherein coefficients of thermal expansion of said metal sheet, said light-transmissive substrate and said adherent layer are approximately equal to one another.

10 7. A flat panel display device according to claim 1, wherein said metal sheet has a uniform thickness in a range of from 20 μm to 250 μm .

8. A flat panel display device according to claim 1, wherein said metal sheet is made of an alloy made chiefly of Fe-Ni.

15 9. A flat panel display device according to claim 1, wherein a cross-sectional shape of said holes is rounded.

10. A flat panel display device according to claim 1, wherein a surface of said metal sheet facing toward said light-transmissive substrate is approximately black.

20 11. A flat panel display device according to claim 1, wherein inner walls of said plurality of holes are electrically conductive.

12. A flat panel display device according to claim 1, wherein a cross-sectional shape of said phosphors is generally U-shaped.

25 13. A flat panel display device according to claim 1, wherein said metal sheet is provided on a side thereof facing toward said rear

substrate with a metal back adapted to be supplied with an accelerating voltage for accelerating said electrons.

14. A flat panel display device according to claim 1, wherein said flat panel display device further comprises spacers for 5 maintaining a spacing between said rear substrate and said display substrate, and said metal sheet is provided with recesses for holding said spacers.

15. A display device comprising:
a rear substrate including an insulating substrate provided
10 with a plurality of cold cathode elements for emitting electrons;
a display substrate including a light-transmissive substrate disposed to face said rear substrate; and
an electrically conductive sheet provided on a surface of said light-transmissive substrate facing toward said rear substrate,
15 wherein said electrically conductive sheet is perforated with a plurality of holes arranged in a matrix configuration, and said plurality of holes have phosphors disposed therewithin for generating light when excited by said electrons emitted from said plurality of cold cathode elements.

20 16. A display device comprising:
a rear substrate including an insulating substrate provided
with a plurality of cold cathode elements for emitting electrons;
a display substrate including a light-transmissive substrate disposed to face said rear substrate; and
25 a black sheet provided on a surface of said light-transmissive

substrate facing toward said rear substrate,

wherein said black sheet is perforated with a plurality of holes arranged in a matrix configuration, and said plurality of holes have phosphors disposed therewith for generating light when excited by electrons emitted from said plurality of cold cathode elements.

5 17. A flat panel display device according to claim 16, wherein said black sheet is electrically conductive.

18. A flat panel display device according to claim 16, wherein said black sheet is made of a metal.

10 19. A display device comprising:

a rear substrate including an insulating substrate provided with a plurality of cold cathode elements for emitting electrons; a display substrate including a light-transmissive substrate disposed to face said rear substrate;

15 spacers interposed between said rear substrate and said display substrate for maintaining a spacing therebetween; and an electrically conductive sheet provided on a surface of said light-transmissive substrate facing toward said rear substrate,

wherein said electrically conductive sheet is perforated with 20 a plurality of holes arranged in a matrix configuration, said plurality of holes have phosphors disposed therewith for generating light when excited by said electrons emitted from said plurality of cold cathode elements, and said electrically conductive sheet is provided with recesses for holding said spacers, at positions of said 25 electrically conductive sheet which do not interfere with said

plurality of holes.